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1. Title of Invention: Hair Dye Composition

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Specification

1. Title of the Invention

Hair Dye Composition

2. Claims

A hair dye composition, being characterized in that from 1 to 60% of one type or two or more types of dyeing effect accelerating substances selected from among 1-phenyl-1,2-ethanediol, o-monocarbethoxy-1,3-propanediol, γ -butyrolactone, δ -valerolactone, α -methyl- γ -butyrolactone, γ -valerolactone, and β -methyl- γ -butyrolactone are compounded to a dye selected from among an acid dye, a metal-containing dye, and a reactive dye.

3. Detailed Description of the Invention

The present invention is to obtain a hair dye composition which is high in a dyeing effect and, also, high in safety depending on types of dyes by using novel dyeing effect accelerating substances (dyeing auxiliaries), which have conventionally never been used, each individually or in any of combinations, or in addition to a conventional dyeing auxiliary, with an acid dye, a metal-containing dye or a reactive dye either.

Conventionally, as a hair dye composition which has been most popularly used, a permanent hair dye composition which uses an oxidation dye has been provided, but it is well known that a dye intermediate such as paraphenylene diamine causes sensitivity to a person who has physical idiosyncrasy and, since it is used along with an action of hydrogen peroxide under an alkaline atmosphere as a application condition, there is a risk of causing a primary irritation to skin depending on usages.

Further, although hair dye compositions which use a solvent dyeing technique have conventionally been developed, many of them ordinarily involve generation of unpleasant odor and, also, are insufficient in dyeing-capacity.

The present inventors have exerted an intensive studies and, as a result, have found a series of compounds which are low in toxicity, small in an influence to skin, mild in a raw material odor and, also, perform a dyeing accelerating effect

widely on an acid dye, a metal-containing dye and a reactive dye and obtained a hair dye composition which has an excellent dyeing function by combining any one of these compounds and each dye.

Namely, according to the invention, by using one type, or two or more types selected from among 1-phenyl-1,2-ethanediol (styrene glycol), o-monocarbethoxy-1,3-propanediol, γ -butyrolactone, δ -valerolactone, α -methyl- γ -butyrolactone, γ -valerolactone, and β -methyl- γ -butyrolactone as dyeing effect accelerating substances and, optionally, simultaneously using a known dyeing effect accelerating substance (dyeing auxiliary) such as benzyl alcohol, by being added to any one of the acid dye, the metal-containing dye and the reactive dye under an acidic condition, hair dye compositions which are each excellent in a dyeing effect, free of the unpleasant odor, and mild in an action to skin or scalp were able to be obtained.

These hair dye compositions, being different from a conventional hair dye composition, can attain an object of dyeing hair by a one-component system and at a pH value close to that of skin.

As for types of the acid dyes to be used according to the invention, mentioned are a triphenylmethane dye, an azo dye, a quinoline dye, an acridine dye, an azine dye, an oxazine dye, an indigoid dye, an anthraquinone dye, a stilbene dye and a thiazole dye.

As for types of metal-containing dyes (1:2 type), a type is selected from among Aizen Opal Color (for example, Blue New Conc.: Hodogaya Chemical Co.), Amichrome Light Color (for example, Orange RL: Uguie Kuhlmann), Irgalan Color (for example, Rubin RL: Ciba-Geigy), Isolan (for example, Gray BBS: Bayer), Kayakalan (for example, Blue Black RL: Nippon Kayaku Co.), Lana Fast (for example, Black BGL: Mitsui Chemicals, Inc.), Lanasyn (for example, Carbon BL: Sandoz), Lanyl (for example, Black BG; Brown BG: Sumitomo Chemical Co.), Levalan (for example, Dark Brown K-TL: Bayer), Ortolan (for example, Black GSP: BASF), and Remalan Fast (for example, Dark Brown BR Conc.: Hoechst).

Further, reactive dyes are described below in accordance with differences of active groups.

1) Cold groups having a dichlorotriazinyl group:

for example, Procion M (ICI); and
Mikacion (Nippon Kayaku Co.;
Mitsubishi Chemical Co.)

2) Hot types having a dichlorotriazinyl group:

for example, Procion H (ICI); and
Cibacron (Ciba-Geigy)

3) Those having a triazinyl group:

for example, Drimarene (Sandoz); and
Reacton (Ciba-Geigy)

4) Those having a vinylsulfonyl group:

for example, Remazol (Hoechst);

Levafix (Bayer);
Cavalite (E. I. DuPont de Nemours);
Lanasol (Ciba-Geigy);
Celvazol (Mitsui Chemicals, Inc.); and
Sumifix (Sumitomo Chemical Co.).

An effect evaluation of a degree of dyeing is conducted on a basis of the degree of dyeing of a dyed cloth. On this occasion, musline was used as a testing cloth (wool swatch) in accordance with JISL0803 and x, y, and z of the dyed cloth were obtained by using a spectrophotometer as a measuring instrument (a color computer manufactured by Toshiba Corporation) and, then, these values were converted to respective color values based on chromatics, namely, L, a, and b and, thereafter, s' was determined by using these L, a, and b values and a calibration formula (color density index without correction based on hues), $s' = (16(100-L)^2 + a^2 + b^2)^{1/2}$, of God Love which exhibits a subjective density and, then, the thus-determined s' was used for the effect evaluation of the degree of dyeing.

Examples of effects in combination with representative dyes are shown below (all percentages are given by weight.)

(1) Example of reactive dye

(dyeing bath):

Dye (Remazol Red R-B)	1.0%
Citric acid	0.15

Dyeing effect accelerating substance x (optimum quantity)

Ion-exchanged water 100-x

The dyeing bath was made such that the dyeing effect accelerating substance was added to ion-exchanged water under stirring to be dissolved and, then, the resultant solution was added with the reactive dye (Remazol Red R-B) and adjusted to have a pH value of 3 by using citric acid.

While the thus-made dyeing bath was kept at a constant temperature of 40°C, a testing cloth was dipped therein for 30 minutes and, then, dried to obtain a dyed cloth.

The thus-obtained dyed cloth was put on a measurement in a manner as described above to obtain s' and, then, a comparison evaluation of the degree of dyeing was conducted.

The dyeing effect accelerating substance to be used was selected from among those shown in Table 1 as described below.

Table 1

Dyeing effect accelerating substance	s'
Non-addition of dyeing effect accelerating substance in the aforementioned dyeing bath	250
*Addition of 4% of benzyl alcohol	278
Addition of 13% of 1-phenyl-1,2-ethanediol	282
(Addition of 10% of 1-phenyl-1,2-ethanediol+3% of benzyl alcohol)	310

* Insoluble in a case of 4% or more.

(2) Example of acid dye

(Dyeing bath):

Dye (Amaranth)	1.0%
Citric acid	0.15
Dye effect accelerating substance	x (optimum quantity)
Ion-exchanged water	100-x

Dyeing conditions are similar to those of Example (1).

Table 2

Dyeing effect accelerating substance	s'
Non-addition of dyeing effect accelerating substance in the aforementioned dyeing bath	270
Addition of 4% of benzyl alcohol	303
Addition of 20% of γ -butyrolactone	310
(Addition of 10% of γ -butyrolactone +2% of benzyl alcohol)	321

(3) Example of metal-containing dye of 1:2 type

(Dyeing bath):

Dye (Lanyl Black BG)	0.25%
Citric acid	0.1
Dye effect accelerating substance	x (optimum quantity)
Ion-exchanged water	100-x

Dyeing conditions are similar to those of Example (1).

Table 3

Dyeing effect accelerating substance	s'
Non-addition of dyeing effect accelerating substance in the aforementioned dyeing bath	213
Addition of 4% of benzyl alcohol	285
Addition of 20% of β -methyl- γ -butyrolactone	288
(Addition of 5% of β -methyl- γ -butyrolactone +2% of benzyl alcohol)	323

Next, as a representative example, a relation of an effect accelerating action shown in each of the reactive dyes of 1-phenyl-1,2-ethanediol and γ -butyrolactone against a concentration is shown in FIG. 1.

The dyeing bath to be used is as follows:

(Dyeing bath) :

Reactive dye	1.0%
Citric acid	0.15
Dye effect accelerating substance	x (optimum quantity)
Ion-exchanged water	100-x

Next, the present invention is described more in detail by giving embodiments.

(Example-1)

Reactive dye (Remazol Red R-B)	1.0%
1-phenyl-1,2-ethanediol	12.0%
Citric acid	0.15%
Hydroxyethyl cellulose	0.3%

Ion-exchanged water

87.55%

Hydroxyethyl cellulose was gradually added to an aqueous solution in which styrene glycol was dissolved in ion-exchanged water and stirred. The resultant solution was added with the reactive dye (Remazol Red R-B) and adjusted to have a pH value of 3 or thereabout by using citric acid and, as a result, a hair dye composition of red color was obtained.

The thus-obtained composition was combined with a melanin pigment in black hair, thereby exhibiting a beautiful auburn-typeed fashion color.

(Example-2)

Reactive dye (Celmazol Black B)	1.3%
O-monocarbethoxy-1,3-propanediol	5.0%
γ -valerolactone	17.0%
Citric acid	0.5%
Hydroxyethyl cellulose	0.3%
Ion-exchanged water	75.9%

A hair dye composition of black color was obtained by being prepared in a manner similar to that in Example-1.

(Example-3)

Acid dye (Black No. 401)	0.5%
Acid dye (Brown No. 201)	0.3%

γ -butyrolactone	20.0%
Citric acid	1.3%
Hydroxyethyl cellulose	0.5%
Ion-exchanged water	77.4%

γ -butyrolactone was added to the ion-exchanged water and stirred and, then, hydroxyethyl cellulose was gradually added to the resultant solution and stirred to obtain a viscous liquid.

The viscous liquid was added with the acid dyes and, then, adjusted to have a pH value of 3 by using citric acid and, as a result, a hair dye composition for dyeing gray hair was obtained.

(Example-4)

Acid dye (Red No. 213)	0.5%
Acid dye (Yellow No. 203)	0.1%
Acid dye (Black No. 401)	0.03%
Styrene glycol	8.0%
Benzyl alcohol	2.0%
Citric acid	1.0%
Ion-exchanged water	88.37%

A fashion color of reddish brown type was obtained by being prepared in a manner similar to that in Example-3.

(Example-5)

Acid dye (Yellow No. 5)	0.2%
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Acid dye (Blue No. 2)	0.06%
Styrene glycol	10.0%
γ -butyrolactone	10.0%
Citric acid	1.0%
Hydroxyethyl cellulose	0.3%
Ion-exchanged water	78.44%

A fashion color of reddish brown type was obtained by being prepared in a manner similar to that in Example-3.

(Example-6)

1:2-typed metal-containing dye (Lanyl Black BG)	0.15%
1:2-typed metal-containing dye (Lanyl Brown 3B)	0.03%
O-monocarbethoxy-1,3-propanediol	10.0%
Citric acid	0.3%
Hydroxyethyl cellulose	0.3%
Ion-exchanged water	89.22%

O-monocarbethoxy-1,3-propanediol was dissolved in the ion-exchanged water and, then, the resultant solution was added with the metal-containing dyes and stirred and, thereafter, adjusted to have a pH value of 3 by using citric acid and, as a result, a hair dye composition of black color for dyeing gray hair was obtained.

(Example-7)

1:2-typed metal-containing dye (Lanyl Brown 3B)	0.1%
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1:2-typed metal-containing dye (Lanyl Black BG)	0.02%
γ -valerolactone	20.0%
Benzyl alcohol	2.0%
Citric acid	0.3%
Hydroxyethyl cellulose	1.0%
Ion-exchanged water	76.58%

A hair dye composition of brown-based fashion color was obtained by being prepared in a manner similar to that in Example-6.

(Example-8)

1:2-typed metal-containing dye (Karayan Black BGL)	1.5%
1:2-typed metal-containing dye (Karayan Brown GL)	0.3%
1-phenyl-1,2-ethanediol	6.0
γ -butyrolactone	10.0%
α -methyl- γ -butyrolactone	3.0%
Citric acid	1.0%
Hydroxyethyl cellulose	0.3%
Ion-exchanged water	77.9%

A black-based hair dye composition was obtained by being prepared in a manner similar to that in Example-6.

4. Brief Description of Drawing

FIG. 1 shows a relation of a concentration of each of (1) 1-phenyl-1,2-ethanediol and (2) γ -butyrolactone which are representative dye effect accelerating substances according to the present invention to be added against color density index s' .

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5. List of Attached Documents

(1) Specification	1
(2) Drawing	1
(3) Request for Patent (Copy)	1
(4) Power of Attorney	1
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